Carthage PCE Plume Site
Carthage, Missouri
Jasper County

January 2024

Site Summary

The Carthage PCE Plume Site features a tetrachloroethene (PCE) groundwater plume whose source is currently unknown. The Missouri Department of Natural Resources is working to discover the source and determine the extent of the contamination. In 2020, the two public water wells that had been most impacted by PCE contamination were taken offline and deactivated. There are currently 10 wells that supply the city's public water treatment plant. Effluent water has remained non-detect for PCE after treatment. **All samples of treated drinking water currently show that the system is meeting all federal Safe Drinking Water Act standards.**

Site History

The department became aware of PCE contamination in the groundwater through routine monitoring of the Carthage Water & Electric Plant (CWEP) public drinking water. Groundwater sampling in 2016 and 2019 showed levels of PCE below the Maximum Contaminant Level (MCL), which is five parts per billion (ppb). The Safe Drinking Water Act uses this MCL as the health-based level for public water consumption. It is based on a running annual average of four quarterly samples. CWEP previously reported the 2016 detection in its annual consumer confidence report. Because the detections were below the MCL, they were not violations of the Safe Drinking Water Act.

Supply wells (raw water): In February and March 2019, at the department's request, CWEP sampled each of the system's 12 supply wells and submitted the samples to the department's laboratory for analysis. The department documented PCE in two wells (Wells 1 and 6) and CWEP immediately took the two wells offline in March. In August 2019, the department collected samples from five selected wells and found PCE in three of them: Wells 1, 5, and 6. Wells 1 and 6 already were offline and Well 5 was offline at the time of the sampling of the treated drinking water in February 2019. Wells 1 and 5 have been permanently sealed. In January 2020, the department's Public Drinking Water Branch collected samples of untreated water at Well 6 and found that detections of PCE are still present in the well. Well 6 is currently online and being treated using agitation and blending, so that the effluent water is non-detect for PCE.

Treated water: PCE was detected in treated water at a level below the MCL in January 2016 and February 2019. Because CWEP blends water from multiple wells based upon demand, no samples of treated water distributed for public consumption have exceeded the MCL for PCE. Nevertheless, CWEP removed from service the three supply wells where PCE was detected. In March 2019, the department placed CWEP on quarterly monitoring. The samples are analyzed for all regulated volatile organic compounds (VOCs), including PCE. Samples of treated water collected in March, April and July 2019 showed no detections of PCE or any other VOCs.

CWEP has reported that the effluent water at the treatment plant continues to have zero detections for PCE.

Below are the documented detections of PCE.

PCE Detections in CWEP Public Water Supply System

Date	Source	Level (ppb)*
Jan. 25, 2016	Treated Water	1.01
Feb. 4, 2019	Treated Water	1.35
Feb. 22, 2019	Treated Water	0.86
Feb. 22, 2019	Well 1-raw water	15.2
March 5, 2019	Well 6-raw water**	2.58
Aug. 13, 2019	Well 1-raw water**	13.8
Aug. 13, 2019	Well 5-raw water**	3.25
Aug. 13, 2019	Well 6-raw water**	4.67
Jan. 7, 2020	Well 6-raw water**	4.74

* The MCL for PCE is 5 ppb and is applicable for CWEP treated water only.

**Offline at time of sampling.

Description of Contaminant

PCE is a nonflammable, colorless VOC that is used in many applications, including as a dry-cleaning agent, fabric finish/water repellant and metal degreasing solvent. It is also utilized as an activator in some consumer products (i.e., patio and garden adhesive, art glue, jewelry and bead adhesive, fabric-textile adhesive, auto rust-buster aerosol, brake-parts cleaner, carburetor cleaner). Other names for PCE include tetrachloroethylene, perchloroethene, perc, and perchlor.

PCE is classified as a chlorinated solvent which will “dechlorinate” and degrade over time into other contaminants. Therefore, the potential degradant products associated with PCE are trichloroethylene (TCE), cis-1, 2-dichloroethene (cis-1, 2 DCE), trans-1, 2-dichloroethene (trans-1, 2 DCE), 1, 1-dichloroethene (1, 1 DCE), vinyl chloride (VC), ethene, and ethane, and will be considered “contaminants of concern” in this investigation.

Although PCE evaporates quickly from water into air, it can also filter easily through soil and into groundwater. It is generally slow to break down in the environment and can remain in groundwater for decades. It is a common contaminant at Superfund sites across the nation. The U.S. Environmental Protection Agency (EPA) classifies PCE as likely to be carcinogenic to humans.

Investigation Activities

In October 2019, the department requested access to private wells in the area to identify if any had detections of PCE or its degradant products. All 22 wells sampled were non-detect during this sampling event.

The department will continue investigating PCE groundwater contamination in the Carthage area through a cooperative agreement with EPA pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). The investigation may include additional groundwater sampling in existing public, private, residential and industrial wells. Depending on those findings, the department may expand the investigation to include soil, soil gas, surface water, indoor air and sub-slab vapor intrusion.

As noted above, the department will continue to analyze quarterly samples from CWEP’s public water supply wells and work with CWEP to ensure its water remains in compliance with all SDWA standards.

How You Can Help

The department is looking for additional information to assist with this investigation, including knowledge regarding any entity, past or present, which may have used PCE in its processes, and the locations of private residential or industrial wells in the Carthage area. If you have any information or know someone with information that may assist with this investigation, please contact the department's site project manager, Claire Quick, at 573-526-3287.

For More Information

For additional information regarding the site or the related investigation, contact Claire Quick at 573-526-3287 or claire.quick@dnr.mo.gov. For information about compliance monitoring results for CWEP's drinking water treatment plant or any public drinking water system in Missouri, visit the department's Drinking Water Watch website at dnr.mo.gov/DWW/DNRLogin.jsp.

Aerial Map